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Biological & Medical Serials

JULY, 1918.

ENTOMOLOGICAL NEWS

Vol. XXIX. No. 7.

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PHILADELPHIA:
THE ACADEMY OF NATURAL SCIENCES,
LOGAN SQUARE.

Entered at the Philadelphia Post-Office as Second-Class Matter.

ENTOMOLOGICAL NEWS

published monthly, **excepting August and September,** in charge of the Entomological Section of The Academy of Natural Sciences, Philadelphia, and The American Entomological Society.

ANNUAL SUBSCRIPTION, $2.00 IN ADVANCE.

SINGLE COPIES 24 CENTS.

Advertising Rates: Per inch, full width of page, single insertion, $1.00; a discount of ten per cent. on insertions of five months or over. No advertisement taken for less than $1.00—Cash in advance.

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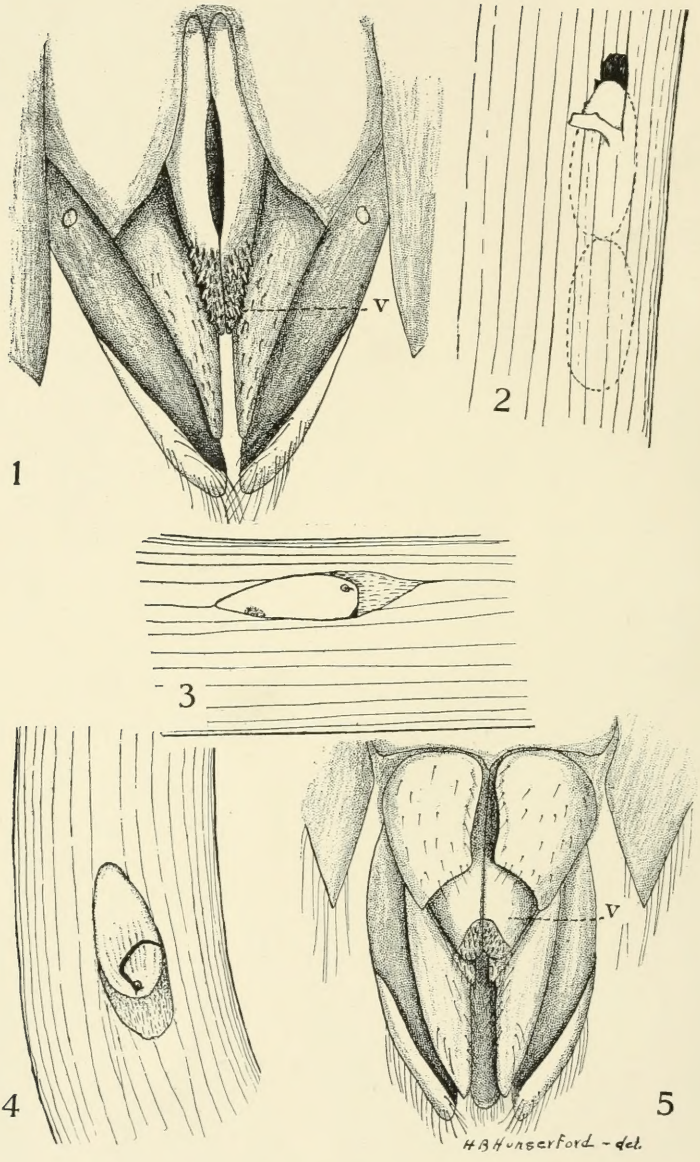

OVIPOSITION OF NOTONECTAE (HET.).—HUNGERFORD.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XXIX. JULY, 1918. NO. 7.

CONTENTS:

Hungerford—Concerning the Oviposition of Notonectae (Hem.)..... 241
Braun—New Genera and Species of Lyonetiidae (Microlepidoptera)... 245
Beutenmuller—Description of a New Periclistus (Cynipidae, Hym.).... 251
Cockerell—A Remarkable New Bee of the Genus Oxaea (Hym.)..... 252
Watson—Hemileuca burnsi, its specific validity and habitat (Saturnidae, Lepid.)..... 252
Wickham—An Interesting new Species of Eleodes (Col.: Tenebrionidae).. 255
Caudell—Regarding Diapheromera veliei Walsh and Manomera blatchleyi Caudell (Orth.: Phasmidae).. 258
Dunn—The Lake Mosquito, Mansonia titillans Walk., and its Host Plant, Pistia stratiotes Linn., in the Canal Zone, Panama (Dip.: Culicidae).. 260
Editorial—"Making the Editorial of Greater Use in Entomology"..... 270
Currie—Occurrence of the Damselfly Argiallagma minutum (Selys) in Southern Florida (Odonata)..... 271
Emergency Entomological Service (U. S. Dept. Agric.)..... 271
Fletcher—The Cottony Cushion Scale, Icerya purchasi, in Ceylon (Homop., Coccidae)..... 274
Entomological Literature..... 274
Review of Fletcher: Report of the Proceedings of the Second Entomological Meeting held at Pusa..... 277
Review of Barnes and McDunnough: Contributions to the Natural History of the Lepidoptera of N. Amer. 277
Doings of Societies—Ent. Sec. of The Acad. of Nat. Sci. Phila. (Orthop., Odonata)..... 278
Twenty-Fifth Anniversary Meeting of the New York Entomological Society..... 278
The Entomological Society of France 278
Feldman Collecting Social (Coleop.) 279
Foundation of the Entomological Society of Spain..... 279
Obituary—Gustave Adolphe Baer..... 280
" Charles Edwin Sleight..... 280
Erratum..... 280

Concerning the Oviposition of Notonectae (Hem.).

By H. B. HUNGERFORD, University of Kansas, Lawrence, Kansas.

(Plates XIV, XV)

This short paper is presented to clear up certain points concerning the oviposition of the back-swimmers of the genus *Notonecta* in America. In a former paper the writer called attention to the diversity of statement in regard to the egg-laying of the European *N. glauca* and to the fact that the American species are said to differ markedly from *N. glauca* as reported by Regimbart.

In view of the careful work of this French writer, who stated that the European form inserts its eggs in the stems of plants, the writer regarded it as strange that all the American species should simply affix their eggs to plants and other supports in the water. In view of the observations of Essenberg in California and Bueno in New York, however, it appeared likely that such might be the case.

In order to account for the apparent discrepancy the writer undertook an investigation of the ovipositors of such forms as he could find about Ithaca, New York, viz., *N. undulata, N. variabilis, N. insulata* and *N. irrorata.*

It was apparent at once that the first three possess structures ill adapted to making incisions in plant tissues of sufficient size to receive the eggs. The last species, however, possesses an ovipositor capable of performing such a function. (Compare Plate XIV, Figs. 1 and 5, and Plate XV, Figs. 9 and 5.) Upon the basis of this preliminary examination it was asserted that *N. irrorata* would be found to place its eggs in the tissue of plants.

Nothing more was done about the matter until spring, when *N. irrorata* females were observed to place their eggs in the stems of moneywort (*Lysimachia nummularia* L.), Juncus, and dead Typha stems.* Here then was a member of the genus *Notonecta* in America that agreed with Regimbart's notes on *N. glauca,* and the writer became interested in a little study of the form and function correlated with the activity under discussion.

N. glauca was secured for study through the kindness of Edmund Gibson, of the National Museum. One female, a pinned specimen, was relaxed sufficiently to permit the removal of the drilling parts. An examination of these parts disclosed the fact that they resemble those of our *N. irrorata* rather than those possessed by the rest of the American series examined. (See Plate XV, Fig. 6.)

Sufficient material of *N. irrorata, N. undulata* and *N. variabilis* was examined to establish the fact that there exists for these forms at least some constancy of size and form. An examination of the accompanying Plate XV will suffice to indicate that, although all are equipped to abrade the surface of the stems, only *N. irrorata*** of our American forms possesses an ovipositor comparable to that of the European *glauca.*

* See Hungerford. Ento. News XXVIII. p. 271, foot note.

** The palaearctic *N. lutea,* reported for this country, also possesses this sort of a structure. (See Plate XV, Fig. 1.)

In the rather compact tissue of Moneywort the eggs of *N. irrorata* are occasionally so placed as to resemble closely the figure presented by Regimbart. In one case, where *Chara* alone was available, two or three eggs were hidden in the mud lodged in one of the lower axils of the plant. As a rule, however, the eggs are placed at or below the surface level of the supporting tissue. In a water-soaked *Typha* leaf several cases were noted where two eggs had been deposited through one puncture. (See Plate XIV, Fig. 2.)

On the other hand, *N. undulata, N. variabilis, N. insulata, N. indica* and an undescribed species reported by Essenberg attach their eggs to the stems and the reader may draw his own conclusions for the others that have been figured. (See Plate XV.) The writer would be glad to receive notes concerning the habits of oviposition of any of the *Notonectae* not hitherto recorded.

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Explanation of Plates XIV and XV.

Plate XIV.

Fig. 1. Ventral view of the genitalia of the female *N. irrorata* showing the drilling parts of the ovipositor—indicated by V. It is one of these parts that is figured from three aspects in Plate XV, figure 9.

Fig. 2. A portion of water-soaked cattail leaf showing two eggs of *N. irrorata* deposited through one puncture.

Fig. 3. Egg of *N. irrorata* in Moneywort stem. The embryos usually develop with cephalic end at micropylar pole of the egg. This one is reversed as shown by the eyespot of the developing nymph within.

Fig. 4. Egg in Moneywort showing the nature of the rent through which the nymph escaped. Postnatal molt removed.

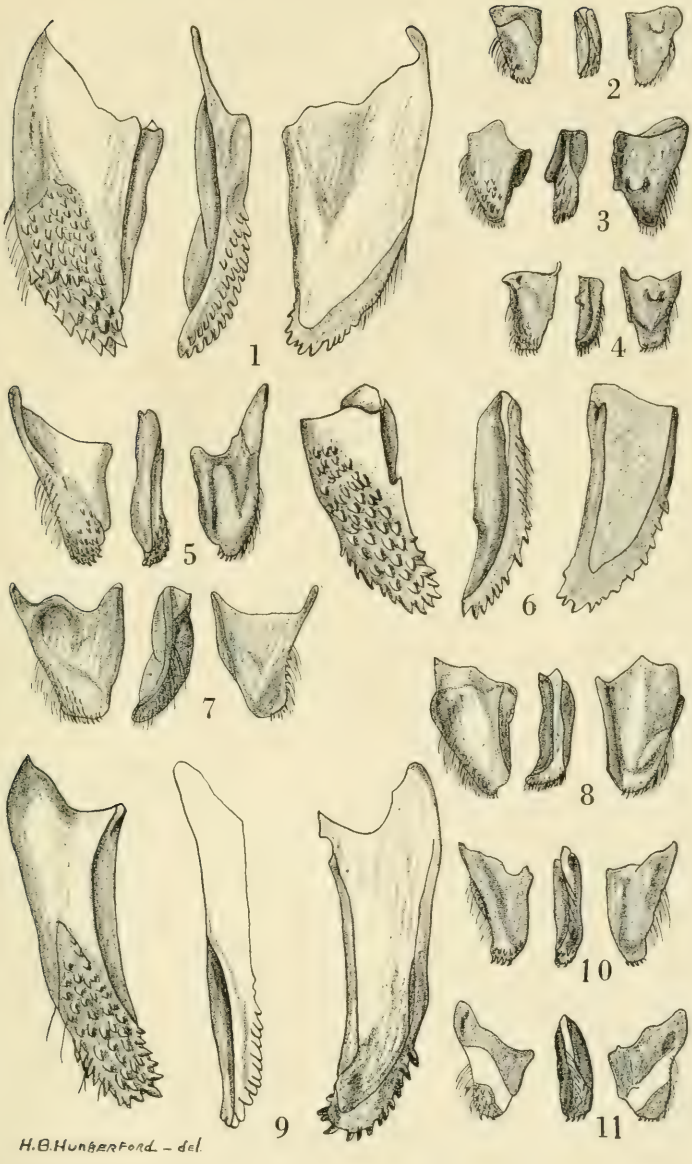
Fig. 5. Ventral view of the genitalia of the female *N. insulata,* showing the drilling parts of the ovipositor—indicated by V. It is one of these parts that is figured from three aspects in Plate XV, figure 5.

Plate XV.

This plate contains three views of the left member of the first pair of gonapophyses of the female of each of the species of the genus *Notonecta* available in this country. Two species have been omitted because of the lack of material.

The views are from left to right: Outside or lateral view—ventral view showing the organ on edge—Inner view. All of the drawings were made with camera lucida and drawn to the same scale. The length of the adult, together with outside measurements of the ovipositor are added for purposes of comparison of relative size of parts. The writer believes that a study of these organs should be taken into account in determining relationship of species. A study of a wide series would certainly establish the range of variability in size and shape of these parts and in some cases (if not all) aid in specific determinations. The drawings here presented are, however, intended to indicate merely the correlation of this organ with the habit of oviposition.

Fig. 1. *Notonecta lutea.* Size of adult, 13-17.1 mm.; valve of ovipositor, 1.625 mm. x .725 mm. Specimen loaned by Mr. Gibson, of Nat. Mus. Taken in Finland by Sahlberg and determined by Kirkaldy.



GONAPOPHYSES OF NOTONECTAE (HET.).—HUNGERFORD.

1. N. LUTEA.
2. N. RALEIGHII.
3. N. UNDULATA.
4. N. VARIABILIS.
5. N. INSULATA.
6. N. GLAUCA.
7. N. MEXICANA.
8. N. SHOOTERII.
9. N. IRRORATA.
10. N. UHLERI.
11. N. INDICA.

Fig. 2. *Notonecta raleighii.* Size of adult, ?; valve of ovipositor .4 mm. x .25 mm. Specimen given to me by Mr. J. R. de la Torre Bueno.

Fig. 3. *Notonecta undulata.* Size of adult, 10-13 mm.; valve of ovipositor, .5 mm. x .312 mm. Material from Ithaca, New York, and Lawrence, Kansas.

Fig. 4. *Notonecta variabilis.* Size of adult, 8.2-10.2 mm.; Valve of ovipositor, .4 x .312 mm.

Fig. 5. *Notonecta insulata.* Size of adult, 12.6-15.5 mm.; valve of ovipositor, .7 x .425 mm. Material from Palo Alto, California.

Fig. 6. *Notonecta glauca.* Size of adult, ?; valve of ovipositor, 1.125 x .55 mm. Loaned from Nat. Museum by Mr. Gibson; a specimen from England, collected by Uhler.

Fig. 7. *Notonecta mexicana.* Size of adult, 11-14 mm.; valve of ovipositor, .7 x .5 mm. Specimens from Arizona.

Fig. 8. *Notonecta shooterii.* Size of adult, 8-13 mm.; valve of ovipositor, .65 x .375 mm. Specimen given to me by Mr. J. R. de la Torre Bueno.

Fig. 9. *Notonecta irrorata.* Size of adult, 11.8-14.4 mm.; valve of ovipositor, 1.675 x .575 mm. Material taken at Ithaca, N. Y.

Fig. 10. *Notonecta uhleri.* Size of adult, 12 mm.; valve of ovipositor, .65 x .35 mm. Specimen given to me by Mr. de la Torre Bueno.

Fig. 11. *Notonecta indica.* Size of adult, 10.5 mm.; valve of ovipositor, .5 x .375 mm. Material from Douglas, Arizona, collected by Dr. Snow.

New Genera and Species of Lyonetiidae (Microlepidoptera).

By Annette F. Braun, Cincinnati, Ohio.

Opostega bistrigulella n. sp.

Head and thorax white. Fore wings white; an oblique fuscous spot at the middle of the dorsal margin with its apex pointing toward the apex of the wing. In the cilia before the apex are a very oblique costal and opposite dorsal streak, the dorsal a little the more oblique and running to the base of the black apical spot. A fuscous line in the cilia around the apex about equally distant from the apical spot above and below the apex, and leaving between it and the oblique costal streak a patch of pure white cilia. Hind wings and cilia almost white. Legs pale yellowish white. Abdomen grayish. Expanse: 12 mm.

Locality: Loma Linda, California, April 23 and May 27. (G. R. Pilate.)

Types in author's collection.

Especially characterized by the shape of the apical line in cilia.

Bucculatrix ceanothiella n. sp.

Face and head white, the tuft with a few brown scales, antennae white, the stalk annulate with dark brown. Ground color of thorax and fore wings white, with sparse dusting of dark brown scales. The dusting becomes more dense along base of costa, and in the basal third of dorsum. Markings formed of groups of dark-tipped scales are situated as follows: a triangular costal spot just beyond one-third; a large oblique streak beyond the middle, becoming attenuated in the middle of the wing and continuing as a line of dark scales to the middle of the hind margin; a scarcely defined grouping of dark-tipped scales before the apex on the costa; a rather large semi-circular spot on the middle of the dorsum, with a few darker scales on its inner side on the fold. Cilia whitish, with a dark line from apex to dorsum. Hind wings and cilia pale silvery gray. Legs whitish. Tarsal joints dark-tipped. Abdomen whitish. Expanse: 6.5 mm.

Locality: Colton, San Bernardino County, California.

Type in author's collection.

The larva is a miner in the leaves of *Ceanothus*, forming at first a small semi-transparent brownish blotch mine; later it feeds externally on the under side of the leaf. Cocoon white, marked with indistinct ridges. Larva in February; imago April 5.

Bucculatrix latella n. sp.

Face and antennal eye-caps white; tuft on the head white, usually with a group of ocherous hairs in the middle posteriorly. Fore wings white, with scattered minutely brown-tipped pale ocherous scales; a broad ocherous streak, sometimes nearly obsolete, from base along fold to one-fifth; on the middle of the dorsum a large conspicuous ocherous patch sometimes reaching the middle of the wing, and bordered internally just above the margin by a small patch of darker brown-tipped raised scales. A little beyond this on the costa, there is a more or less distinct patch of the pale ocherous brown-tipped scales. At the end of the cell is a minute, but distinct black dot. A patch of pale ocherous dark-tipped scales in the apex of the wing; the ocherous shade in the scales sometimes lacking, leaving only the dark tips. Hind wings grayish, cilia ocherous at their bases, shading outwardly to pure white. Legs whitish. Expanse: 10-12 mm.

Locality: Loma Linda, California, April 21 to June 4. (G. R. Pilate.)

Types in author's collection.

Bucculatrix quadrigemina n. sp.

Face and antennal eye-caps white, antennal stalk annulate with brown. Tuft whitish, mixed with pale fawn. Fore wings whitish. There are four rather distinctly defined costal patches of ocherous brown-tipped scales; the first, within the basal fourth, oblique on its outer edge, passes into a pale ocherous shade below the fold; the second, narrower and more oblique; the third, broad and diffused, becoming pale ocherous toward the middle of the wing, where it meets the apex of the second spot, and a dorsal patch of darker brown-tipped raised scales occupying the middle of the dorsum opposite the space between the second and third costal spots. The fourth costal patch, lying just before the apex, is sometimes extended to enclose the entire apical portion of the wing. A small patch of dark-tipped scales on the dorsum lies between the dorsal raised scales and the apical patch. Cilia white, dusted with dark-tipped scales, especially opposite the apex and beneath the apical patch of dark-tipped scales. Hind wings and cilia gray. Legs grayish buff, tarsal segments tipped with black. Expanse: 7 mm.

Locality: Loma Linda, California, June 18 to 30 (G. R. Pilate).

Types in author's collection.

Bucculatrix eupatoriella n. sp.

Face pale yellowish. Tuft ocherous in front shading to reddish brown behind. Antennal eye-caps ocherous shading to reddish outwardly; stalk, brown. Thorax and fore wings bright brownish or reddish ocherous; markings silvery metallic. At the basal two-fifths an oblique silvery costal streak; a little nearer the base an oblique silvery dorsal streak, followed immediately by a patch of dark brown raised scales. At two-thirds a second oblique costal streak, margined internally especially on the costa with dark-tipped scales, and opposite this a pair of almost confluent silvery dorsal streaks, the first margined internally, the second externally with dark-tipped scales. In the cilia above the apex is an elongated dull white spot; beneath this a transverse streak of silvery scales forms the inner border of a small black apical spot. Cilia gray with a row of brown-tipped scales extending from the dull white costal spot to the dorsum. Hind wings and cilia dark gray. Legs gray; basal and apical fourth of hind tibiae dark with black spurs, middle portion and hairs silvery; tarsi black-tipped. Abdomen dark gray above, silvery beneath. Expanse: 5.5-6.5 mm.

Localities: Cincinnati, Ohio; Balsam, North Carolina.

The *type* is from Cincinnati and is one of the series of reared specimens.

Type and *paratypes* in author's collection; paratype in the collection of the Entomological Branch, Department of Agriculture, Ottawa, Canada.

The pale green larva feeds on *Eupatorium perfoliatum*, making at first a very long much-contorted linear mine, later feeding externally on the under side of the leaf, eating small patches and leaving only the upper epidermis. A single leaf contains often twenty or more mines. The white-ribbed cocoon is spun on the under side of the leaf, usually up against the midrib. Larvae and cocoons collected August 13, produced imagoes from August 16 to 24. An earlier generation of moths appears at the beginning of July.

This species is allied to *B. trifasciella* Clemens, but differs from it in the brilliant luster of the markings and the absence of the costal streak near the base.

Bucculatrix insolita n. sp.

Face dark gray, tuft of whitish and dark gray or brown scales intermixed; eye-caps grayish, antennal stalk black. Thorax and basal third of fore wings white to a line extending a little obliquely outward from costa to dorsum. Costal edge from base almost to one-third black; a few scattered black scales near base of dorsum, and usually a patch of ocherous fuscous dusting on the fold within the basal third. Middle third of wing blackish, bordered outwardly by two oblique curved white streaks, meeting in the middle of the wing. Apical third of wing dusted with fuscous, black and tawny scales. A white costal streak precedes the apex, in which there is a small black spot. Cilia dark gray, with a line of black-tipped scales around the apex. Hind wings and cilia fuscous. Legs black, tarsal segments silvery at base. Abdomen blackish with silvery gray anal tuft. Expanse: 7-7.5 mm.

Locality: San Bernardino Mountains, California (August 29-30), with the note "beaten from fir."

Types in author's collection.

The very striking contrast between the almost white basal third and the black middle of the wing will assure immediate recognition of this species.

Bucculatrix pertenuis n. sp.

Face and head white. Tuft white with a few darker hairs in the middle, varying from pale ocherous to brown. Antennal stalk brownish. Ground color of the thorax and fore wings creamy white, markings varying from pale ocherous with sparse dusting, to brownish ocherous. The extreme edge of the costa near the base is black or dark brown, and just within the costa is some scattered darker dusting. An ocherous streak along the fold reaches one-third of the wing length. Just before the middle of the wing, there is a narrow curved very oblique costal streak, which, before reaching the middle of the wing, bends and runs parallel to costa; its apex meets a slightly less oblique and broader, more darkly dusted costal streak beginning at the middle of the costa and running more or less distinctly across the wing into the dusting just before and beneath the apex. A broad triangular costal spot before the tip of the wing Scattered dusting along the base of the dorsum joins an outwardly curved rather broad streak on the middle of the dorsal margin, marked on its inner side just beneath the fold by a black dot. Beyond this streak at the tornus is a dusted spot. A more or less distinct line of dusting in the apex extending obliquely toward base. A dark line around the apex in the cilia. Hind wings pale grayish ocherous. Legs whitish, anterior pair and tips of tarsi dark brown. Expanse: 6.5 mm.

Locality: Winnfield, Louisiana, June 27 to July 9 (G. R. Pilate).

Types in author's collection.

EXEGETIA new genus.

Head and face smooth; tongue moderate. Antennae two-thirds, in male shortly ciliate, basal segment, enlarged, flattened, concave beneath, and further enlarged by a pointed flap of scales projecting anteriorly and at apex to form a rather large eye-cap. Labial palpi short, drooping, second joint with some rough projecting scales beneath. Fore wings narrow lanceolate with the apex slightly downturned; 1b furcate at base, 2 represented only by a short spur just before 3, 3 continuous with lower margin of cell, lower angle of cell not well defined, 4 and 5 connate, 7 and 8 stalked to near costa, 7 to costa, 9 and 10 from near end of cell, 11 from before middle; cell open between 5 and 7. Hind wings two-thirds, lanceolate, cilia

3; 5 and 6 coincident, stem perceptible to base; cell open between 4 and 5 + 6, and between 5 + 6 and 7. Hind tibiae smooth.

Genotype: *Exegetia crocea* n. sp.

Allied to *Erioptris* Meyr. and *Otoptris* Meyr., especially to the former. In general aspect, it resembles *Tischeria,* to which it is also related, but is relatively narrower and longer winged.

Exegetia crocea n. sp.

Face, head and antennal eye-caps light reddish ocherous; antennal stalk fuscous. Fore wings pale ocherous, reddish tinted at the base, with a little fuscous dusting on costa near base; shading to reddish ocherous toward apex. Hind wings and cilia pale ocherous. Legs ocherous, irrorated with purplish fuscous. Abdomen ocherous, grayish toward tip. Expanse: 11 mm.

Locality: Owen River Valley, California.

Type in author's collection.

DICRANOCTETES new genus.

Head, smooth; tongue present. Labial palpi long, slender, widely diverging, terminal joint two-thirds of second, acute. Maxillary palpi obsolete. Antennae two-thirds, finely ciliated in the male, basal segment flattened, scarcely enlarged. Fore wings ovate-lanceolate, apex sharply upturned; 1b simple, 2 absent, 3 from angle and continuous with lower margin of cell, 4 absent, 5, 6 and 7 out of 8, 5 from near base of stalk, 7 to costa, 9 connate with stalk of 5, 6, 7 and 8, cell open between 9 and 10, 11 from before middle of cell; cell narrow, margins becoming coincident at base. Hind wings, one-half lanceolate, cilia 3; 4 absent, 6 absent, cell open between 3 and 5. Posterior tibiae with bristly hairs above.

Genotype: *Dicranoctetes angularis* n. sp.

Allied to *Hieroxestis* Meyr., particularly in general features of the neuration, but differing in the smooth head and absence of maxillary palpi. All the veins indicated in the description as present, are distinct, showing no tendency toward obsolescence.

Dicranoctetes angularis n. sp.

Face and palpi silvery; a spot at the base, in the middle and tip of the terminal segment of palpus black; head and antennae gray. Thorax and fore wings gray shading outwardly to brownish black. Just beyond the middle is an angulated white fascia almost interrupted in the middle by the blackish ground color. Costal and apical cilia white; two nearly perpendicular black streaks in the costal cilia; a black streak extending outward into the apical cilia, with a faint streak branching obliquely upward from it. A black apical spot. Cilia below the apex gray, with a black line through them starting a little below the apex. Hind wings and cilia gray. Legs silvery, fore and hind tarsi gray. Expanse: 7 mm.

Locality: Mountain Lake Park, Maryland, July 26.

Type in author's collection.

Description of a New Periclistus (Cynipidae, Hym.).

By William Beutenmuller, New York.

Periclistus castanopsidis, sp. nov.

♀. Head yellowish brown, face striately punctate, vertex and cheeks finely punctate. Antennae 14-jointed, yellowish brown, somewhat darker terminally.

Thorax black, collar yellowish brown or black, finely punctate and pubescent. Parapsidal grooves almost continuous, not quite extending to the collar and most distinct at the scutellum; the grooves are parallel to about the middle, then curve inwardly to the scutellum where they are moderately widely separated. Anterior parallel lines exceedingly fine and scarcely evident. Median groove wanting. Lateral grooves scarcely evident. Pleurae black, striate, with a large black, glossy area. Scutellum black, rugose, basal fovea large.

Abdomen yellowish brown with a large brown-black dorsal patch, smooth and shining.

Legs pale yellowish brown. Wings hyaline. Radial area closed. Cubitus continuous. Areolet large. Length, 2.25 mm.

Habitat: Truckee, California (H. G. Dyar).

Described from two females reared from galls of *Andricus castanopsidis* Beutm., on *Castanopsis chrysophylla,* March 14, 1914. It is a guest-fly.

Type: Collection United States National Museum. *Cotype*: Collection of Wm. Beutenmuller.

A Remarkable New Bee of the Genus Oxaea (Hym.).

By T. D. A. Cockerell, Boulder, Colorado.

I have just received a bee, collected by Dr. Eugenio Giocomelli, at La Rioja, Argentina, which looks like a *Centris,* but actually belongs to the rare genus *Oxaea.* The superficial resemblance to *Centris* is such that I began running it through the tables for that genus, until I noticed the entirely different venation. We appear to have an excellent case of Müllerian mimicry.

Oxaea haematura n. sp.

♀. Length, 19 mm.; head black, with white hair, short fuscous hair on occiput; facial quadrangle about as broad as long; eyes green; labrum with a strong median ridge, the upper part of which is grooved; clypeus closely punctured but shining; antennae black; thorax black, very densely covered with hair as in the similar species of *Centris,* this hair dorsally bright fulvous, ventrally creamy-white; tegulae clear fulvous; wings strongly dusky, nervures piceous; legs black; hind tibiae and tarsi with stiff black hair, but the tibiae with a large loose white scopa beneath; abdomen with the first four segments brilliant blood-red, dull, hairless, almost impunctate, but the second segment shows fine punctures; fifth segment black, glistening, well punctured, posteriorly with a thick black fringe, and on each side with a tuft of creamy-white hair; apex with black hair; apical plate very broad, the middle portion elevated; venter dark, the first three segments with bright ferruginous hind margins.

Quite unlike any other *Oxaea;* nearest to the Brazilian *O. rufa* Friese, which has dark-brown hair, and is considerably larger.

Type in the writer's collection.

Hemileuca burnsi, its specific validity and habitat (Saturnidae, Lepid.).

By J. Henry Watson, Withington, Manchester, England.

Sir George Hampson has lately called my attention to a note by Dr. Dyar in Insec. Insc. Mens. of December, 1916, on the locality of *H. burnsi,* which I described in Trans. Manch. Ent. Soc. 1910, as from the Truckee Pass, California,

and in which I am rather "hauled over the coals" for having given an erroneous locality. For this reason only he accepted this as a distinct species from *H. neumoegeni* as it was from a different life zone from the latter species, its actual locality being Reno, Nevada, a town some thousands of feet lower down the pass. He, however, entirely ignores the fact that I distinctly stated Reno, Nevada, on two subsequent occasions (Ent. News XXIII, p. 97, and Ent. News XXIV, p. 130,) where I described certain forms of *burnsi* as having been bred from pupae collected by Mr. Burns at Reno, Nevada, and which, according to Dr. Dyar's interview with Mr. Burns, appears to be its correct locality.

Well, first I have yet to learn that an insect's title to rank as a separate species depends on its vertical distribution and, secondly, I, myself, am totally unacquainted with the district and gave the localities as I received them from Mr. Burns. But apart from this, this insect is not *neumoegeni*, and I am not quite so surprised at Dr. Dyar's not identifying it correctly, for he states the specimen figured in Packard, Mon. of the Bomb. Moths of N. A., Vol. III, Pl. LX, fig. 7, to be a male, whereas it is a female, as can be distinguished by its black and white banded body. The male of *burnsi* is described and figured by myself as well as ab. *ilmae* as having an all cream body, and the question is whether Dr. Dyar had seen a male. I am quite aware that, apart from my own collection, there were very few specimens of this insect in the U. S. A. collections; just as on this side of the Atlantic there are very few *neumoegeni*. To my knowledge at the time of describing *burnsi*, both this insect and *neumoegeni* were entirely wanting in all European collections that I am acquainted with: Berlin, Leiden, Paris, Mons. Chas. Oberthur's Coll. at Rennes, the British Museum, Rothschild's collection at Tring and the Oxford and Manchester Museums among the larger ones. Since *burnsi* has been described, however, I have examined the only four specimens of *neumoegeni* in Europe that are known to me: these are the four male specimens in the Oxford Museum, taken at Prescott, Arizona, by Dr. Kunze, June, 1910, and of which I was very kindly al-

lowed to add one to my collection. I do not know the female except from specimens figured in Packard's Vol. III, but the four specimens examined, as well as all the photographs of specimens of *neumoegeni,* can be distinguished from *burnsi* invariably by the body color, by the color of the antennae and by the dead white texture of the wings of *neumoegeni,* which Dr. Barnes calls attention to in Packard's Vol. III, and which Dr. Dyar remarks upon. My own series of *burnsi,* including the ab. *ilmae* and other forms amounts to 133 specimens, of which 45 are males; now it appears these are *all* from Reno instead of *some* from the Truckee Pass, as given to me by Mr. Burns. (Mr. Burns, like many other field workers, is certainly not one of the best caligraphists, and, as a matter of fact, nearly all of his most interesting letters to me are written in pencil.)

There is not one of these specimens which cannot be distinguished from the four specimens of *neumoegeni,* which I have examined, and the splendid photographs of the type specimen and other specimens figured in Packard, by two or three characters which are palpable: a small lozenge-shaped transparent spot (not found in *burnsi*) in the cell of the forewing in *neumoegeni;* the light orange brown antennae in both sexes of *neumoegeni* compared with the black brown of *burnsi;* the cream body of *burnsi* males and the orange brown body of *neumoegeni;* and another character which can be readily noticed is that on the forewing, the submarginal wavy band ends on the costa with a slight curve towards the apex in *neumoegeni;* this is constant in the single specimen which I have and in all the photographs of this insect, in either sex, figured in Packard, but which is not so in any specimen of *burnsi,* which I possess or have seen (compare Packard, Plate LXIII, figs. 5, 6 and 7, and plate LXVII, figs. 1 and 2).

I have in preparation some additional notes on Packard's Vol. III and I am stating there that the food plant of *H. burnsi* is sagebush, as Mr. Burns stated in a letter to me about two or three years ago. Apart from the fact that Dr. Dyar calls attention to this erroneous locality, I think that

would put the matter right, as I believe the habitat of the plant would give the habitat of the insect.

Might I say in conclusion, if anything further were needed to show the specific distinction between these two insects, that on an occasion before the insect was described, when I was at Tring I read Edward's original description of *neumoegeni* out while Dr. Jordan examined a specimen of *burnsi,* and when we had gotten half-way through Dr. Jordan said, "You may stop, that description does not apply to this insect at all." This was *after* Dr. Dyar suggested that I should not describe this insect as their investigator was examining a *Hemileuca* in S. Nevada. Who that investigator was, or what the insect was, I am uncertain. If it was Prof. Aldrich, the larvae which he was investigating and which were used as food by the Indians, some of which were sent to me for identification, were not the larvae of *H. burnsi,* as they fed on willow on the margins of streams. If it was Mr. Ainslie, the insect that he was investigating and of which I have a long series, was *Euleucophaeas oliviae*, which feeds on various hard grasses but which I succeeded for a time in getting to feed on some of our common English grasses.

An Interesting new Species of Eleodes (Col.: Tenebrionidae).

By H. F. Wickham, Iowa City, Iowa.

During the late autumn of 1916, I was engaged by the U. S. Bureau of Entomology in making some field investigations of *Eleodes.* Until fairly recently, these insects were not known to inflict much damage upon field and forage crops, but it now looks as if they might have to be reckoned with in various sections of the semiarid interior, since the larvae have developed considerable capacity for depredations upon wheat. In the course of my work, I came across one very small but interesting undescribed species, occurring in abundance in the bean-growing district near Willard, New Mexico, and, though it has not yet been reported as troublesome, it seems desirable that a name be assigned in order that some use may be made

of the field notes and experimental records now in the files of the Bureau. The following description is published by official permission.

In making out the diagnosis, I have tried to follow the general outline laid down by Dr. Blaisdell*, without attempting his extreme refinement of detail. The new species runs easily to his subgenus *Trichieleodes* and is readily separable from either of the two already described by its much smaller size and different vestiture. It is probably very local in habitat, otherwise it seems as if specimens must have come to hand in some of the numerous collections made in the southwestern states during the past fifty years.

Eleodes barbata new species.

Ovate, about twice as long as wide or occasionally a little more elongate, clothed with sparse, curved, golden hairs, intermixed with very much longer straight, erect, black ones.

Head feebly convex, frontal suture hardly visible and then only in certain lights; punctuation strong but not coarse nor very dense, with a tendency to form indistinct series radiating from the center of the vertex; hairs similar to those on the prothorax but shorter. Antennae reaching about two-thirds to the prothoracic base, outer three joints moderately incrassate, hardly compressed, third joint scarcely or barely equal to the next two taken together, fourth and fifth subequal, eighth hardly larger than the seventh.

Pronotum widest near the middle, about three-fourths as long as wide, disk moderately convex from side to side, strongly shining, golden hairs of the inner coat numerous but not obscuring the surface, long black hairs sparser, punctures strong and deep, of moderate size, separated by their own diameters or more on the median area, closer and more confused at sides, where they are distinctly muricate. Apex arcuately emarginate, finely beaded on each side of the middle; sides nearly evenly arcuate, a little more rapidly narrowed posteriorly, distinctly margined, the bead fine, attaining the base which is truncate, finely margined at middle, a little more strongly at sides, subequal to the apex; hind angles small but distinct. Propleurae polished, rather strongly, irregularly and more or less rugosely punctured.

Elytra oval, strongly shining, widest along the middle third, base truncate, humeri rounded, sides more arcuate basally and apically, subparallel medially; apex rounded, obtuse, disk convex on the dorsum, more strongly so laterally, posteriorly rather suddenly but not quite vertically declivous; surface very densely, seriately but not quite reg-

* Bulletin 63, U. S. National Museum, Washington, 1909.

ularly punctate, the punctures moderately deep, muricate or subasperate, especially towards the sides and tip. Vestiture double, similar to that of the pronotum.

Epipleurae finely, rugosely punctured. Meso- and metathoracic sidepieces shining, punctures moderate in size, deep, more or less crowded or confluent. Abdomen sparsely hairy, moderately punctured, the last segment much more finely and sparsely.

Legs of moderate length and stoutness, relatively shorter than in *E. hirsuta,* closely and fairly coarsely punctured, with double vestiture, the long hairs more numerous upon the tibiae than on the femora. Thighs simple, fore and middle tibiae about straight, hind tibiae very plainly recurved or bent upwards at tip.

The first abdominal segment is distinctly shorter than the second and third united. The prosternum has a strong mucro upon its posterior face. The spurs of the fore tibiae are rather slender, slightly curved and subequal to each other in both sexes, but are longer in the female: those of the middle and hind tibiae are straight, the inner much longer than the outer. The male has a flatter abdomen than the female and is less robust.

Length, 6 to 7.25 mm. Breadth, ♂, 3 mm., ♀, 3.50 mm.

In general appearance, this species recalls *E. hirsuta* Horn, but differs in size, outline, and many other characters. Some of the most readily seen differentials in *E. barbata* are the relatively longer elytra with more pronounced humeri and more broadly rounded apex, the double vestiture with decidedly more conspicuous long hairs, relatively shorter legs and antennae, sparser prothoracic punctuation and shorter first ventral. It looks decidedly like an *Amphidora,* but a study of the generic characters inclines me to place it in *Eleodes.* Little difference exists in the tarsal vestiture of the Blaptini and the Amphidorini, as defined by LeConte and Horn* but the present insect goes better with *Eleodes* by the form of the elytral epipleurae and the size of the tibial spurs.

Numerous specimens were taken under dried dung among short brush in the fine sandy soil about Willard, New Mexico, in September.

Types have been returned to the U. S. Bureau of Entomology.

* Classification of the Coleoptera of North America. Washington, 1883, pp. 373 and 375.

Regarding Diapheromera velii Walsh and Manomera blatchleyi Caudell (Orth.: Phasmidae).

By A. N. Caudell, of the Bureau of Entomology, U. S. Department of Agriculture, Washington, D. C.

The type material of *Diapheromera velii* Walsh consisted of one female specimen from Illinois, taken in a place overgrown by weeds beneath the boughs of two isolated ash trees, and one pair from Nebraska taken by Dr. Velie in a place overgrown by weeds but with no trees within a long distance of it. The description drawn from these three specimens appears to apply to *Manomera blatchleyi* so far as concerns the female, but the characters ascribed to the male apply to the true *velii*. The slender acute basal spine of the cerci of the male described by Walsh certainly pertain to *velii* rather than to *blatchleyi* and, besides, if it had been the male of *blatchleyi* Walsh had before him he would very surely have mentioned the but slightly swollen intermediate femora as a character decidedly at variance with those of *D. femorata*, the species with which he compared this new species. That he did specifically notice the middle femora is evident from the fact that he mentions their lacking the brown banding of *femorata*. Thus it appears very certain that, while the female from Illinois was quite surely a specimen of *M. blatchleyi*, the male from Nebraska, probably also the Nebraska female, was the true *velii*. That the male is to be rightly considered as the specific type is evident from the fact that the male is morphologically the more important in this group and that this construction is according to good sense and in compliance with Par. 73*h* of the Entomological Code of Nomenclature.

Diapheromera velii may be distinguished from *Manomera blatchleyi* by the comparatively shorter and anteriorly broader head of both sexes, by the strongly swollen intermediate femora of the male and by the posterior femora of both male and female being furnished beneath with a prominent subapical spine, in *Manomera* this spine being either entirely absent or very small. The last dorsal segment of the abdomen of the

female is longer in *blatchleyi* than in *veliei,* being about 4 mm. in the former and 3 mm. in the latter; the cerci of the female *Manomera* are also decidedly longer than in either *Diapheromera veliei* or *femorata,* the actual length in adult individuals before me being 3.75 mm. in *blatchleyi,* 2 mm. in *veliei* and 1.25 mm. in *femorata.* Additional characters for the separation of the males of *veliei* and *blatchleyi* are found in the inner basal projections of the cerci, these being slender and apically acute in *veliei,* while in *blatchleyi* they are blunter and stouter, less so, however, than in *D. femorata.*

Diapheromera veliei is apparently not at all a common species and probably does not occur in Illinois, or rarely so.

Material in the National Museum comes from the following localities; San Diego, Texas, May 15th, one ♂, Schwarz; Victoria, Texas, August 24th, one ♂, W. E. Hinds; 40 miles South of Alice, Texas, June 15th, 1904, one mated pair, Barber; Stillwater, Oklahoma, one ♂, Caudell; Garden City, Kansas, July 27th, 1891, one ♀; Lakin, Kansas, July 27th, 1891, one ♂; Pipestone, Minnesota, August 4th, 1911, one ♂. The locality labels on the Kansas specimens are not perfectly legible and, as the dates are the same, it is possible that they are from the same source.

As represented by the above listed material this species is seen to extend across the Middle States from Texas to Minnesota. The exact local habitat of none of these specimens is known except of the mated pair from 40 miles south of Alice, Texas; these were taken by Mr. Barber on weeds or shrubs on the prairie some distance from any woodland. This agrees with the habitat of the type.

Manomera blatchleyi is represented in the National Museum by material from Iowa, Indiana, Illinois, Kansas, Oklahoma, Maryland, Virginia, New York and New Jersey. The Atlantic Coast material is composed of female specimens only, but they appear to agree specifically with specimens from the type locality. The Middle West specimens, so far as known, were taken in open field or prairie regions. Of the Atlantic Coast specimens I took one in the woods on a stone and Mr. Barber took one on a post by the Club House on Plummer's Island, Maryland. These are the only ones of which I know the exact

local habitat, but my good friend, Wm. T. Davis, of Staten Island, New York, who has taken these insects in numbers, assures me that this is not a tree species. The following quotation is from a recent letter from him on this question: "I have collected a great many females of the *Manomera* that occurs about New York, and have seen a great many more that I let stay in the low vegetation, so that they might not be exterminated. I have always found the insects on golden rods, Asters and such like plants, and can assure you that it isn't a tree species." This conforms with the known habitat of more western material and seems to make rather sure the determination of these eastern specimens as *blatchleyi*. It is certainly singular that among the somewhat ample material of Atlantic Coast specimens found in various eastern collections not a single male is to be found. Can it be that this indicates parthenogenesis?

The Lake Mosquito, Mansonia titillans Walk., and its Host Plant, Pistia stratiotes Linn., in the Canal Zone, Panama (Dip.: Culicidae).*

By L. H. Dunn, formerly Entomologist of Board of Health Laboratory, Ancon, Canal Zone.

That the formation of Gatun Lake introduced new elements creating prominent changes in the flora and insect fauna of the Canal Zone, Panama, is manifest beyond all doubt. Prior to the beginning of the construction of the Gatun Dam and the Spillway, the area now covered by the lake was traversed by the swift-flowing Chagres River and the numerous smaller rivers forming its tributaries. The Chagres afforded good drainage throughout its valley with the exception of a low marshy area south of Gatun. This area was known as the "Black Swamp." It was several square miles in extent and of irregular formation. In the dry season this region consisted of a series of small lakes, pools and sluggish streams.

* Read before the Medical Association of the Isthmian Canal Zone, January 18, 1918.

In the rainy season nearly the whole of this area usually became inundated and formed a large swamp with considerable jungle growth.

In 1910, when the construction of the dam and spillway had progressed sufficiently to cause an appreciable interruption in the flow of the Chagres River, great changes began to take place in the topography of the lower Chagres Valley. During that year the Chagres changed from a swift rolling river with sea level at Gatun during high tide to a small lake, some current being still retained through the portion occupying the former river channel. This lake slowly widened and formed estuaries both to the east and west as the low valleys permitted. It also gradually extended southward with a quieting effect on the former swift current. During the wet season of 1910 this lake reached a depth of 18 feet. During 1911 sufficient water was retained to increase the depth to 20 feet. In 1912 a depth of 56 feet was present. In 1913 enough water was released to reduce the depth to 48 feet, and the water was at this level when the gates of the spillway were closed on July 1, 1913. With the closing of all the gates the depth increased from month to month until January 1, 1914, when the surface of the lake reached its required elevation, approximately 85 feet above sea level. At this elevation the lake has a surface area of more than 170 square miles and a depth of more than 87 feet in its deepest parts. At some points it extends southward to a distance of 9 or 10 miles outside the Canal Zone. The irregularities of its contour causes it to have a shore line of more than 1000 miles.

Prior to the formation of this great artificial lake, *Mansonia titillans,* the "lake mosquito"—as we are terming it on account of its abundance in the lake regions—and its host plant, the wild water lettuce, *Pistia stratiotes,* were present in comparatively small numbers in the Canal Zone.

Before the waters of the lake flooded the "Black Swamp," a few scattered masses of the water lettuce occurred in the various small bodies of water found within the area of this marshy region. A few more small isolated colonies were also

to be found in a low-lying marshy area in the vicinity of Ancon and Balboa. A few plants were also reported present in a marshy area in the vicinity of the upper Trinidad River.

The spread of this plant at that time was very slow. The isolation of the colonies in shallow pools, which became almost devoid of water during the dry season, proved rather unfavorable for its multiplication at the Pacific end of the Zone. The scattered small masses in the Chagres Valley were prevented from increasing to any great extent by the fact that when heavy rains occurred all colonies that had spread from the ponds and pools, in which they were growing, to the small streams, were invariably swept down by the increased current of the latter to the Chagres. They were then carried along on the surface of this river to the sea. However, with the rising of the lake and the cessation of the currents the rivers were gradually changed to sluggish bodies of water. The plants then left the small pools to which they had been previously confined and floated on the surface of the rising waters, driven about by the action of the winds. They were soon carried to the outer periphery of the inundated lowlands, where the thick forest growth and stagnant waters offered good protection and opportunity to flourish under these altered conditions. Consequently they increased so rapidly that large floating islands were soon formed. This rapid expansion continued until today in some parts of the lake these plants may be observed covering the surface of the water in masses several miles in diameter, reminding one of bright-green, level meadows.

Before the increase of the *Pistia* took place in the Canal Zone, but few specimens of its associated mosquito, *Mansonia titillans,* were to be found here. In writing of this mosquito Knab[1] remarks, "In working over the mosquito material from the Canal Zone collected by Messrs. Busck and Jennings from 1907 on, the absence of this characteristic species was most

[1] Knab, Frederick. Changes in the Mosquito Fauna of Panama. Proceedings of the Entomological Society of Washington, Vol. XV, No. 1, page 41, 1913.

striking. Mr. Busck reported it from only one locality, Lion Hill, and Mr. Jennings did not send it in at all." The same writer,[2] in mentioning the abundance of this mosquito at a later date (1913), states, "In lots of mosquitoes taken recently and sent for determination by Mr. James Zetek, the entomologist of the Canal Zone, both *Mansonia titillans* and *Aedeomyia squamipennis* appear in considerable proportion."

That *M. titillans* has continued to multiply with considerable rapidity is plainly shown by the number of this species found among the mosquitoes caught by hand in the habitations of the Canal Zone. From February 1, 1916, to January 31, 1917, out of a total catch of 391,019 mosquitoes, 251,332, or more than 64 per cent., were of this species.

The association of the larvae of *M. titillans* with the *Pistia* plant was first discovered by Prof. H. W. B. Moore,[3] of Georgetown, British Guiana, in 1910. Later, in 1915, he[4] succeeded in observing also the egg-laying habits of the adult female. The habits and life history of this mosquito are more peculiar and interesting than those of any other of the many varieties of whose habits and life history we have any knowledge.*

The egg of this species is small and dark colored. One end tapers into a slender elongation which equals about one-half the length of the egg. This elongation gives the egg the general appearance of a minute Indian club minus the hand-grasp. Eggs freshly deposited by females confined in breeding jars, which did not contain plant life, were pale white but

[2] Ibid.

[3] Moore, H. W. B. Found at last. The Daily Argosy Demerara, Jan. 27, 1910. Quoted by Dyar and Knab in Entomological News, Vol. 21, p. 259, 1910.

[4] Dyar and Knab. Eggs and Oviposition in Certain Species of Mansonia. Insecutor Inscitiae Menstruus. Vol. IV, Nos. 4-6, p. 62, 1916.

[*Comparison should, however, be made with the similar habits of the larva of *Culex perturbans*. See Smith, J. B., Ent. News, xix, pp. 22-25, pls. iii-iv, Jan., 1908, and Grossbeck, J. A., *t. c.*, pp. 473-476, pl. xxiii, Dec., 1908.—Ed.]

changed to a dark brown in a few hours. They were usually scattered over the surface of the water. Under natural conditions the eggs are attached to the under surface of a *Pistia* leaf lying flat, or nearly so, on the surface of the water.

While ovipositing the female clings to the edge of the leaf or hangs suspended by her legs between two leaves that are nearly contiguous. The lower end of her abdomen curves beneath the edge of the leaf and the eggs are attached in a mass to its under surface.

Ordinarily mosquito larvae live free in the water and secure their air supply at the surface. This species adopts a somewhat different mode of procedure. The breathing tubes in both the larval and pupal forms are so modified as to enable them to attach themselves to the roots of the *Pistia* and secure their air supply directly from the plant at some distance from the surface. When a young larva of *M. titillans* emerges from the egg it descends into the mass of rootlets of the plant and pierces the thin outer skin of one of them with its pointed air siphon. The siphon remains in this small opening and the larva grows and passes the larval stage attached to the host plant in this manner.

The filamentous roots of the *Pistia* forms a mass heavy enough to cause them to hang straight downward in the water. The larvae, when attached, also usually hang with head downward. Naturally the anal gills extend outward in an opposite direction from the air-siphon. Occasionally the larvae are observed to change this position and lie extended at a right angle to the root. It has also been noted that while in this horizontal position they frequently swing around with a circular motion, the attached siphon acting as an axis. Very likely this latter position is assumed while feeding. It is very probable that they feed on the microscopic plankton, desquamations from the plant roots, and other vegetable debris found in such profuse abundance among these masses of roots. Larvae have been observed so thickly coated with small particles of decayed vegetable matter that, when in the water, they could hardly be recognized as larvae, if attention

were not directed to them by their motion. This covering usually consists of desquamated particles from the plant roots, which, becoming attached to the hairs of the larvae, causes them to resemble small pieces of decayed vegetable fibre. This is especially true of larvae found in small land-locked pools at the side of a river, where the water is usually stagnant.

The young larvae that emerged from eggs deposited by females in confinement rarely lived longer than twenty-four hours and never seemed to take any food.

Although we have not been able to study the development of the larvae under natural conditions, it is nevertheless quite manifest from laboratory observations that they develop very slowly. Young larvae that have been removed from their environment and placed in breeding jars containing *Pistia* plants readily attached themselves but never lived longer than eight days, showed no appreciable increase in size and did not pupate. Large larvae that were apparently mature and ready to pupate also readily attached themselves to the plants when placed under these conditions, but they also seemed to be rather short-lived when confined in breeding jars. Usually those that failed to pupate within seven or eight days after being placed in the jars died before pupation. A few lived for longer periods of time and succeeded in reaching the pupal stage. One full grown larva attached to a plant lived in a jar for nineteen days and then pupated. In confinement they seem to thrive better in water that is stagnant and quite foul with vegetable debris than in clean fresh water. Naturally this is due in part to the increased food supply found in the water containing the extraneous matter.

When placed in a dish containing *no* plant life the larvae are capable of living for a few days as free living larvae, somewhat similar to those of *Culex*. They hang head downward with the air-tube at the surface of the water, going back and forth from the bottom to the surface to feed and breathe. Very often they will hang from the surface for long periods of time and they also seem to be capable of remaining at the

bottom under water for extended periods. They seem to have an aversion for sunlight and will descend and bury themselves in the debris at the bottom of the container as soon as it is placed where the sun can shine on it. Usually when progressing through the water they move backwards with a quick, jerking, sideways movement of the abdominal segments. They are rapid in movement and when at the bottom of a dish are difficult to take up in a pipette on account of being able to propel themselves through the debris so rapidly. They seldom live longer than five or six days in a jar which does not contain *Pistia* plants.

That the pupa forms and makes it escape from the larval skin without causing the latter to become detached from the air-supplying rootlet is quite evident as the empty larval skins are frequently found still attached.

Like the larvae, the pupae also attach themselves to the *Pistia* and secure their air supply from the porous rootlets. The respiratory tubes of a pupa are long and slender and curve backward, downward and slightly outward. When attached to a plant the tips of these tubes are sometimes directed inward and inserted in the root so closely together that they nearly join in the plant tissue. At other times they are inserted with nearly the width of the pupa between the two tips. We have never observed these tubes inserted widely apart as the outward curve of the tips would lead one to suspect would be the procedure. The pupae often hang suspended by the air-siphons with the head and dorsal surface proximate to the rootlet.

When placed in breeding jars the pupae survive and seem to change to imagines as readily as under natural conditions, whether the plants are present or not. If plants are present the pupae soon affix themselves to the rootlets and remain attached during the pupal period. If no plants are present they obtain their air-supply at the surface of the water like other pupae, and are able to move about at either the surface or the bottom with apparently equal facility. The pupal period ranges from two to five days. A three-day period seems to be the average.

Although we have carefully observed a number of pupae, we have not been able to witness the actual emergence of an imago from a pupa when attached to a plant. When in confinement it would seem that the greater percentage of adults emerge at night, usually between midnight and morning, possibly during the early morning hours. However, from what we have observed on the emergence of the imagines, we are convinced that the pupae detach themselves and ascend to the surface when the time for the adults to emerge arrives. Pupae have been noted attached to the roots at certain points and after the ecdysis a close search has been made for the pupal skins; none were ever found attached to the points previously noted. When adults emerge in breeding jars containing *Pistia,* pupal skins are found on the surface of the water. Repeated careful examinations of the plants for attached empty skins, after the emerging of the adults, always proved negative.

From laboratory observations we assume that a pupa attaches itself to the roots so lightly that the first struggles of the imago, in attempting to escape from the pupal skin, alone suffice to detach the air-tubes from the plant tissue, and allow an ascent to the surface. An examination of an empty pupal skin discloses that the imago forces itself through the dorsal surface of the cephalothorax, and the position of the air siphons *in situ* would not permit of the passage of the imago between them on its way to the surface—which would be the course indicated by the position frequently maintained by the pupa when attached—without causing them to become detached from the plant.

The adult mosquito of this species is easily recognized by the narrow, light-colored band on the proboscis, large palpi, brown thorax, truncated abdomen, wings densely clothed with broad dark brown and yellow scales which give them a mottled appearance, and the yellowish white bands on the tarsi. While resting, the mosquito assumes a crouching position, with the thorax and abdomen held close to and parallel with, the surface on which it rests. The legs are held in such a position that the femorotibial joint, or knee, of each leg extends above the level of the thorax and resembles a small inverted letter V. This gives the appearance of the body being suspended from the legs, rather than supported by them.

This species of mosquito is tropical or subtropical in its habitat. It is widely distributed, being found in some parts of the Southern States, Mexico, Central and South America,

and the Antilles. In Panama it is at present the most ubiquitous mosquito of the Gatun Lake region. It is a strong flier, and travels for long distances and may be encountered in the jungle several miles from the lake shore.

Between twilight and sunrise seems to be their favorite time of activity. In the evening, shortly after sundown, they begin their search for a blood meal. They may then be encountered in towns and settlements, in the forests, and also flying about over the surface of Gatun Lake at some distance from the shore. They appear to be strongly attracted by light and the smell of man, and enter houses, either screened or unscreened, without any hesitation. Being sure and vigorous in flight, they are especially adept in entering screened houses. Alighting on the outside of the screens at points nearest to the lights, they dart through an opened door at the first opportunity, or find holes or rents in the screening through which they can enter.

They will fly over Gatun Lake and bite occupants of boats, if not at too great a distance from the shore, as readily as men in the forests. The writer has been bitten by this species while in a steam launch at least three-quarters of a mile from the nearest shore. This was during early twilight, about 6.30 P. M. Although the launch was traveling at the rate of eight miles an hour, they did not seem to be deterred from their attempts to gain a meal of blood. They could be plainly observed darting under the awning of the launch by the dozens. Although the most of their attacks were directed at our ankles near the bottom of the boat, where they were protected from the wind caused by the boat's passage, they did not neglect our hands and faces which were above the level of the boat's gunwales. Many of these winged hypodermics were also plainly visible darting around the light at the bow of the boat. It appeared that we were either going through large numbers of them flying in the air, or else a number were keeping pace with our boat and flying about the bow light. The evening was calm with no appreciable wind blowing over the lake. Frequently these mosquitoes will also apparently without the least hesitation, enter railway trains, as they stop at the several stations in the lake region while en route across the Isthmus, and prey on the passengers.

Although they will bite readily during all hours between sunset and sunrise, they shun the light as much as possible and do not usually bite in bright daylight. However, in a darkened room of a house, or along narrow trails through the

jungle where the luxuriant growths furnish ample shade they will attack one as viciously during the day as at night time.

This mosquito is a persistent biter and thin clothing sometimes offers but little protection against them. A thin shirt, if it fits closely, is no defense against their attacks. They will also pierce heavy drill riding breeches, and if the attacks are directed at the knees—where the breeches are usually tight when one is sitting down—they can extract a meal of blood without much difficulty.

We have confined females of this species in a test tube and then applied the latter to the palm of the hand; the tough cuticle was pierced and engorgement took place as readily as on a thinner area of the skin.

When biting the female usually lowers her head and buries the proboscis as deeply as possible in the skin, meanwhile elevating the abdomen. As soon as the proboscis is inserted to its full length, the abdomen is lowered until the posterior end practically rests on the skin. The head is then raised and the proboscis slowly withdrawn until only the tip remains in the puncture. The alternate insertion and withdrawal of the proboscis, which may be likened to the action of a plunger in a pump, continues until the female becomes gorged. One female was observed to insert and practically withdraw her proboscis twelve times during a feeding of two minutes' duration. Although this is the usual mode of procedure in feeding, a few females have been noticed to insert the proboscis as deeply as possible and remain almost motionless, filling with blood slowly but steadily and occasionally expelling a few small drops of bloody fluid *per anum*. This sometimes continues for a period exceeding ten minutes. Although females confined in breeding cages when allowed to bite unmolested, are slow in becoming gorged as compared with other varieties of mosquitoes, they are very persistent and will gorge themselves nearly to the bursting point. One female was noticed to take blood very slowly, with the mouth parts deeply inserted, and became apparently full of blood in six minutes. She then withdrew the proboscis, walked about a little, and after expelling a few drops of dark-colored fluid from the anus, again inserted the proboscis and began taking more blood. She remained *in situ* ten minutes this second time. At the end of this period she walked up on the side of the cage and rested, apparently so full of blood that she was unable to fly.

(To be continued.)

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Occurrence of the Damselfly Argiallagma minutum (Selys) in Southern Florida (Odonata).

In a small collection of dragonflies made by Mr. C. A. Mosier on Paradise Key, Royal Palm State Park, in the Everglades of Dade County, Florida, November, 1917, and deposited in the National Museum by the Bureau of Plant Industry, United States Department of Agriculture, through Dr. W. E. Safford, were two female specimens of this interesting little dragonfly. This appears to be the first record of the occurrence of this Neotropical species within the limits of the United States.

The species was described from Cuba in 1857. Dr. Calvert, in the Neuroptera volume of Biologia Centrali-Americana, pages 376-377, records it from Calisco, Cuba, (one male and one female collected by Poey) and from Los Amates, Guatemala, (one male collected January 16, 1905, by Mr. E. B. Williamson).

The monotypic genus *Argiallagma*, as stated by Dr. Calvert, belongs in the same division of the legion Agrion as do *Hyponeura* and *Argia*, but differs from those genera in that the long biserial hairs are less numerous (5-7 on the third tibiae), the postcubitals are fewer in number so that the nodal sector arises near the fifth postcubital on the front wings and near the fourth on the hind wings (origin of this sector one or more postcubitals farther distad in *Hyponeura* and *Argia*), and the female has an apical ventral spine on the eighth abdominal segment.

No doubt additional collections made in this picturesque section of Southern Florida will bring to light other interesting dragonfly records.—Rolla P. Currie, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

Emergency Entomological Service. (U. S. Dept. Agric.)

In the following summary of number 12 of these reports, dated June 1, 1918, topics are arranged in the same order as that followed in the summary of number 11 (Ent. News, June, 1918, pages 234-236) for ease of comparison.

Climatic Effects on Insects.—At the insectary at East Falls Church, Virginia, little winter killing of wood-boring Cerambycid larvae was observed and data are given for the conclusion "that a continued low temperature is more fatal to these wood-boring larvae than fluctuating low temperatures and that the fatal low temperature is somewhere between 15-20 deg. [F.] below zero. Also there seems to be a greater mortality in exposed wood than in moist logs on the ground. The difference in humidity under these conditions may be an important factor." Milder winters around Washington seem to have more disastrous effects on the European Pine Sawfly (*Diprion simile* Hartig)

ENTOMOLOGICAL NEWS.

PHILADELPHIA, PA., JULY, 1918.

"Making the Editorial of Greater Use to Entomology."

As a result of the editorial under this title in the NEWS for June we have received the following:

I noted in your editorial in the last issue of the Ent. News that you wished to know how the editorials might be "made of greater use and assistance to the progress of entomology." If in some way it would be possible for an editor to give information in his subject to those who wish to learn some of its phases with which he is unfamiliar, I am sure you would earn the "undying gratitude" of many a "would-be" investigator like myself, who knows little of what has already been done and lacks the necessary material to investigate phases of the subject which are worthy of further study. This, however, would place an undue burden on the editor; but if he could undertake to put the applicant into communication with some one who would be willing to give information or lend material, it would certainly be a great help to anyone in my position, who has no one to consult with other than those he chances to hear of, or takes the liberty of writing to, and whose material for study is limited to what he can collect, or cajole some more fortunate individual to lend him. I have found entomologists to be wonderfully sympathetic and ready to help to the fullest extent of their ability; but I know of others who dislike to appear so shamelessly bold as to ask favors from utter strangers, and have therefore gone without the needed material and information which my brazen "cheek" has obtained for me, but if these persons had some way of getting in touch with entomologists through the medium of your editorial columns or otherwise, I think this would help one class of investigators, at any rate. I must admit, however, that I am "speaking two words for myself, and one for the other fellow," and this proposition is so onesided, that I imagine most people would not care to bother with it. As far as my own material is concerned, I'd be only too willing to lend it to anyone who needs it, in order to help on the good work and to pass on the assistance I have so freely received from others, and if you know of anyone who needs material I would be glad to help him out as much as I am able.

The NEWS and its editors, through editorials or otherwise, will be glad to help our correspondents to get in touch with other workers whose assistance may be the one thing needful for the prosecution of researches on which they may be engaged.

than the severe winter of 1917-18. The past winter is thought to have had no appreciable effect in decreasing or retarding the appearance of the tent-caterpillar near Washington, D. C.

Aphids.—"A few warm days in early April followed by a cool rainy April and a cool May have resulted in the most serious outbreak of aphids that western Oregon has experienced in recent years. Practically no type of crop or plant has escaped infestation and in the majority of cases the attack is extreme"; *Macrosiphum pisi* is especially mentioned. Experimental work to destroy the insects took several forms. A wooden drag, 10 feet long, 18 inches wide, pulled by a horse through 12 acres captured 140 pounds of aphids. A fungus, "*Empusa aphidis* Hoffman, is killing aphids in great numbers, but apparently only in limited areas." The same *Macrosiphum* is doing considerable damage to later pole varieties of peas in Louisiana.

"After an unusually mild and open winter, followed by a cool and rainless spring," *Macrosiphum creelii* appeared in great numbers on alfalfa near Fernley, Nevada. The rosy apple aphis is unusually abundant in the Rogue River valley, Oregon, and has done injury to apples in West Virginia; the green peach aphis, *Myzus persicae,* is abundant at Wenatchee, Washington. Complaints of the melon aphis (*Aphis gossypii*) come from California, Texas and Alabama, of the bean aphis (*A. rumicis* L.) from California, Ohio and New Jersey. In New Jersey, "the rosy apple aphis and other aphids of the orchard, especially *Aphis pomi,* received such a severe set back from the April snow and sleet storm that injuries are inconsequential." Apple aphids "are relatively scarce" in Connecticut. The non-appearance of aphids at Wichita, Kansas, up to May 16, is noted as unusual; they "are very scarce throughout the entire western part of Michigan."

Sweet Potato Weevils.—Observations on the Sweet Potato Weevil (*Cylas formicarius* Fab.) in flight are recorded, although it is believed not to fly long distances. Another weevil, which attacks this plant in Jamaica, has been found on *Calonyction aculeatum* and *Ipomoea pescaprae* at Moore Haven, in extreme southern Florida. It is *Euscepes porcellus* Boh., very closely related to the so-called sweet potato "scarabee" (*E. batatae*).

Control of the **Colorado potato beetle** in Louisiana appears to be succeeding.

Damage by the **chinch bug** in Texas will depend much on weather conditions; in some counties they are very abundant.

In May, in York County, Maine, **Lachnosterna tristis** "visited shade trees in such numbers that their flight made a noise that exceeds that of a dozen swarms of bees . . . a very unusual record for Maine."

Plum curculio attacks are mentioned for the Ozark region of Arkansas and Southern Indiana.

The **pear thrips** continues its attacks in California, prunes being largely affected.

Cotton boll weevil reports come from Arkansas, southeastern Alabama, southwestern Georgia and from Florida. *Prodenia ornithogalli, Diacrisia virginica* and cutworms are injuring Texan cotton.

While **grasshoppers** (*Melanoplus* sp.) will apparently be especially abundant in western Montana this season, it is thought that the infested territory will not be so extensive as last year, as a large amount of the then vacant land has been ploughed up. From eastern Oregon comes the report: "Will make May 11 our first big drive when we expect out at least 500 people. Expect to mix and spread about 3000 pounds of poison then as about 300 acres of egg deposits will be ready to treat. The hoppers are not leaving the egg beds to any extent yet, but remain massed up. In some places several acres will be completely covered with hoppers, several deep."

Injurious Insects of Great Abundance.—Among other injurious insects special mention is made of the fall web worm in Florida and the pecan nut case bearer (*Acrobasis hebescella*) in Texas, both on pecans; the blackhead fireworm on cranberry in Washington; cut worms in Texas on all kinds of plants, in Arizona, Oklahoma, Kansas, Tennessee, Indiana, Wisconsin, Georgia, Pennsylvania and New Jersey; the potato flea beetle (*Epitrix cucumeris* Harr.) in many localities; the larger stalk borer (*Papaipema nitela* Guen.) on tomato in Mississippi; the asparagus beetle (*Crioceris asparagi* L.) in Maryland and Virginia; mealy bugs (*Pseudococcus*) and *Pulvinaria* sp. on figs in Louisiana, the Argentine ant being a potent factor in the distribution of the mealy bugs; grain weevils (*Silvanus surinamensis, Calandria oryzae*) in warehouses in Oregon. The gipsy moth has gained additional ground in Connecticut.

A class in the **Entomology of Disease, Hygiene and Sanitation** composed of about forty members of the United States Bureau of Entomology has been formed. The course of study will consist of thirty or more lectures, about one-half hour in length, followed by reviews of important publications. The course is principally aimed at training a large group of men for army and municipal sanitary entomology. The proceedings are mimeographed and will be sent to any one desiring to enroll in the class. Teachers not now presenting courses in this subject may possibly desire to give the course to groups of advanced students. All correspondence should be addressed to the class secretary, Jacob Kotinsky, Bureau of Entomology, Washington, D. C.

The Cottony Cushion Scale, Icerya purchasi, in Ceylon (Homop., Coccidae).

Information has recently been received from the Government of Ceylon to the effect that *Icerya purchasi* has become established in that Colony, and a leaflet issued by the Ceylon Department of Agriculture gives further information, whereby it appears that this pest was first discovered in December, 1915, on *Acacia decurrens* on an estate in the Agrapatnas, Central Province, and that by October, 1916, it had increased in numbers and spread on to *Acacia dealbata*. In August, 1916, it was discovered in enormous numbers in an Acacia forest at Ambawela and subsequently was found on Acacias at Galaha and Upper Hewaheta, appearing also on Citrus trees at Galaha. It has apparently also been found on other trees at Kandy. It thus becomes apparent that *Icerya purchasi* has obtained a firm footing in Ceylon and has evidently been present in that island for some time. . . . .

So far as we know at present, India is free of this scale. It is, however, quite possible that it may occur. If any readers should come across specimens answering to the description and figures here given, they will confer a benefit on the general public by informing me at once and sending specimens to Pusa for examination in order that prompt measures may be taken to prevent the spread of this noxious insect.—T. Bainbrigge Fletcher, Imperial Entomologist, in *The Agricultural Journal of India*, vol. xii, pt. iv, pp. 525-531. Oct., 1917.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted: but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in Heavy-Faced Type refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new species are all grouped at the end of each Order of which they treat. Unless mentioned in the title, the number of the new species occurring north of Mexico is given at end of title, within brackets.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

2—Transactions, American Entomological Society, Philadelphia. **4**—The Canadian Entomologist. **6**—Journal, New York Entomological Society. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **21**—The Entomologist's

Record, London. **143**—Ohio Journal of Science, Columbus. **161** Proceedings, Biological Society of Washington. **200**—Bulletin Biologique de la France et de la Belgique. **208**—Boletin, Real Sociedad Espanola de Historia Natural, Madrid. **263**—Proceedings, Hawaiian Entomological Society, Honolulu. **373**—Contributions to the Natural History of the Lepidoptera of North America, by Wm. Barnes and J. H. McDunnough, Decatur, Ill. **394**—Parasitology, Cambridge, England. **447**—Journal of Agricultural Research, Washington. **480.** The Annals of Applied Biology. **519**—The Scientific Monthly, Lancaster, Pa. **534**—Proceedings, California Academy of Sciences, San Francisco. **536**—Journal, Bombay Natural History Society. **540**—The Lepidopterist, Salem, Mass. **543**—Genetics, Princeton, N. J.

GENERAL SUBJECT. Felt, E. P.—Gall insects and their relations to plants. **519,** vi, 509-25. Entomological research and utility. **519,** vi, 551-3. **Glaser, R. W.**—The aerobic nature of insect tissue. **6,** xxvi, 1-3. **St. John, W. St. A.**—Formaldehyde in the setting of insects and in the prevention of "verdigris," **9,** 1918, 91-2. **Sleight, C. E.**—Obituary notice by W. T. Davis. **6,** xxvi, 47-8.

PHYSIOLOGY AND EMBRYOLOGY. Metz, C. W.—The linkage of eight sex-linked characters in Drosophila virilis. **543,** iii, 107-34. **Weinstein. A.**—Coincidence of crossing over in Drosophila melanogaster. **543,** iii, 135-172.

NEUROPTERA, ETC. Nuttall, C. H. F.—The biology of Phthirus pubis (Parasitica). **394,** x, 383-405.

ORTHOPTERA. Criddle, N.—The egg-laying habits of some of the Acrididae. **4,** 1918, 145-51. **Fowler, W. W.**—A combined instance of protective resemblance and mimicry in a locust. **8,** 1918, 92. **Illingworth, J. F.**—Notes on the mating of cockroaches. **263,** iii, 374-5. **Weiss & Dickerson.**—The European mole cricket, Gryllotalpa gryllotalpa, an introduced insect pest. **6,** xxvi, 18-23.

HEMIPTERA. De Long, D. M.—The occurrence of a probable gynandromorph in the homoptera. **143,** xviii, 226-8. **Drake, C. J.**—Two new tingids from the West Indies. **143,** xviii, 174-6. **Hungerford, H. B.**—Notes on the oviposition of some semi-aquatic hemiptera (Hebrus, Salda, Lamprocanthia). **6,** xxvi, 12-18. **Knight, H. H.**—Synoptic key to the subfamilies of Miridae. **6,** xxvi, 40-4. **Muir, F.**—Homopterous notes, II. **263,** iii, 414-29. **Petherbridge & Husain**—A study of the capsid bugs found on apple trees. **480,** iv, 179-205.

Ball, E. D.—A new genus and three n. sps. of North American Membracidae. **161,** xxxi, 27-30. **Barber, H. G.**—Concerning Lyga-

eidae—No. 1. **6,** xxvi, 44-6. **Van Duzee, E. P.**—Report upon a collection of Hemiptera made by W. M. Gifford in 1916-1917 chiefly in California [many new]. **534,** (4), vii, 249-318.

LEPIDOPTERA. Bartsch, R. C. B.—Notes on collecting, preparing and preservation of L. **540,** ii, 25-7 (cont.). **Beutenmuller, W.**—The food-plants of Catocala. Notes on the eggs of Catocala. **540,** ii, 28-30; 33-4. **Lathy, P. T.**—Two n. sps. of Satyridae from So. America. **9,** 1918, 82-3. **Lindsey, A. W.**—Notes on distribution. **540,** ii, 30-17; 37-38. **Turner, H. J.**—A new method of mounting and preserving in series. **21,** 1918, 76-7. **Wood & Selkregg**—Further notes on Laspeyresia molesta. **447,** xiii, 59-72. **Watson, F. E.**—A large number of sps. of butterflies observed in one day's collecting. **6,** xxvi, 3-7.

Anon—A new form of Catocala minuta. **540,** ii, 28. **Barnes & McDunnough**—Notes and new species [many new]. **373,** iv, 61-180. **Comstock, J. A.**—Melitaea anicia: two new aberrations. **540,** ii, 34-7. **Swett, L. W.**—Xanthotype crocataria, with a description of new sps. **540,** ii, 38-9 (cont.).

DIPTERA. Hutchison, R. H.—Overwintering of the house fly. **447,** xiii, 149-69. **Roubaud, E.**—Precisions sur "Phormia azurea." Muscide a larves hemophages parasites des oiseaux d'europe. **200,** li, 420-30. **Wright, R. E.**—The distance mosquitoes can fly. **536,** xxv, 511-12.

Alexander, C. P.—New nearctic crane-flies. Part V. [7 new.] **4,** 1918, 158-65 (cont.). **Dietz, W. G.**—A revision of the N. A. species of the tipulid genus Pachyrhina, with descriptions of [23] n. sps. **2,** xliv, 105-140. **Malloch, J. R.**—Key to the N. A. sps. of Agromyza related to simplex. [1 new.] **4,** 1918, 178-9. **Parker, R. R.**—A new sp. of Sarcophaga from Niagara Falls, N. Y. **6,** xxvi, 28-30. **Sturtevant, A. H.**—Acalypterae collected in Mobile Co., Alabama. [1 new.] **6,** xxvi, 34-40.

COLEOPTERA. Champion, G. C.—New and little known saltatorial Dascillidae. **8,** 1918, 93-102 (cont.). **Garnett, R. T.**—An annotated list of the Cerambycidae of California. **4,** 1918, 172-77 (cont.). **Leng, C. W.**—Microclytus—a correction. Description of a new sp. of Piezocorynus. **6,** xxvi, 8-10; 11-12. **Robinson, W.**—Beetles collected on a dead black oak in Virginia. **6,** xxvi, 30-3.

Liljeblad, E.—Descriptions of eight n. sps. of C. in the family Mordellidae. **4,** 1918, 153-8.

HYMENOPTERA. Burrill & Smith—A preliminary list of the ants of Wisconsin. **143,** xviii, 229-32. **Chapman, T. A.**—Prolonged

life in a headless ant. **21,** 1918, 42-4. **Fenton, F. A.**—The parasites of leaf-hoppers, with special reference to the biology of the Anleoninae. **143,** xviii, 177-212. **Lichtenstein & Picard**—Etude morphologique et biologique du "Sycosoter lavagnei," hecabolide parasite de l' "Hypoborus ficus." **200,** li, 440-74. **Mercet, R. G.**—El genero Centrodora. **208,** xviii, 103-9. **Roubaud, E.**—Le venin et l'evolution paralysante chez les hymenopteres predateurs. **200,** li, 391-419. **Wheeler, W. M.**—Ants collected in British Guiana by C. W. Beebe. **6,** xxvi, 23-28.

Gahan, A. B.—An interesting new hymenopterous parasite. **4,** 1918, 151-2.

Report of the Proceedings of the Second Entomological Meeting—Held at Pusa on the 5th to 12th of February, 1917. Edited by T. Bainbrigge Fletcher, R.N., F.L.S., F.E.S., F.Z.S., Imperial Entomologist. Calcutta, Superintendent Government Printing, India. Calcutta, 1917.—This meeting was remarkably successful, the various entomological interests being represented by twenty-five members and two visitors. The report makes a handsome volume of 312 pages, with a very complete index. There are 34 colored plates, representing the life-histories of injurious insects. An additional plate is a group picture of those in attendance at the meeting.

The conference covered a wide field, hill crops, leguminous field-crops, oil-seeds, Malvaceae, nonmalvaceous fibre plants, cane, cereals, grasses and fodder crops, fruit trees, palms, garden plants, drugs and dyes, cruciferous crops, pests of stored products, etc., were all considered. The report impresses one with the great activity shown in regard to economic entomology in India and with the value of such meetings as a means of calling attention to the importance of the work. The excellent plates will also appeal to the systematist who is not interested in the economic features of entomology.—H. S. (*Advt.*)

Contributions to the Natural History of the Lepidoptera of North America, Vol. IV, pt. 2. By William Barnes, S.B., M.D. and J. H. McDunnough, Ph.D. There are 119 pages and 14 plates. This part consists of notes and descriptions of new species and varieties. Typical specimens are figured in many instances and also the new species and varieties. Species in most of the families of the Rhopalocera and Heterocera are considered. There is a decided improvement in the half-tone plates of this number. The authors still cling to the antiquated method of type citations. The single type method is imperative. This work is of the greatest value to the students of the Lepidoptera.—H. S.

Doings of Societies.

Entomological Section of The Academy of Natural Sciences of Philadelphia.

Meeting of March 28, 1918. Vice Director R. C. Williams, Jr., presiding. Eleven persons present.

Orthoptera.—Mr. Rehn spoke on the distribution of some species of the Acridid subfamily Eumastacinae in California, Arizona and Nevada, making special reference to that of the short- and long-winged forms.

Odonata.—Dr. Calvert exhibited some Odonata from Pennsylvania, collected by members of the State Zoologist's department at Harrisburg, forwarded by Mr. Daecke. They included *Calopteryx amata* Hagen, one female from Charter Oak, Huntingdon County, June 20, 1917, by H. B. Kirk; apparently the first record of this species from Pennsylvania. From Charter Oak, were also specimens of *Tachopteryx thoreyi, Ophiogomphus johannus, Cordulegaster obliquus,* and *Helocordula uhleri,*—all more eastern records in Pennsylvania for these species than have been previously noted.

After more or less extended discussions on the above subjects, the meeting adjourned.—E. T. Cresson, Jr., *Recorder.*

Twenty-Fifth Anniversary Meeting of the New York Entomological Society.

A special meeting of the New York Entomological Society was held on Friday evening, June 7th, at the Hotel Colonial, 81st St. and Columbus Ave., New York City, to celebrate the Twenty-fifth Anniversary of the incorporation meeting of June 7th, 1893. The programme at 8.30 P. M. comprised the History of the Society; Reminiscences by Mrs. Annie Trumbull Slosson, Mr. Henry Bird and others of the older members; and remarks by guests representing sister societies, among whom were Dr. Henry Skinner and Mr. J. A. G. Rehn, of the American Entomological Society of Philadelphia.

The Entomological Society of France.

At its meeting of December 26, 1917, the Society elected J. de Joannis and J. Künckel d'Herculais honorary members to fill the vacancies due to the deaths of A. Grouvelle and M. Standfuss. The recommendations of the committee making the nominations, from which these two members were selected by the Society, based the claims of M. de Joannis to this honor on his systematic, synonymic, geographical and biological work on Microlepidoptera, those of M. Künckel d'Herculais on his fundamental memoir on *Volucella,* that on Brehm's collection, on "the best treatise on general entomology in the French language," and on numerous other works on taxonomy,

anatomy, development, metamorphoses and biology of insects. Of the fourteen honorary members of the Society, eight are French (Bedel, Bouvier, Brölemann, Fauvel, Joannis, Künckel d'Herculais, Mabille, Raffray); one Italian (Berlese), one Spanish (Bolivar), one American (Howard), one Belgian (Lameere), one Russian (the grand-duke Nicholas Romanoff) and one English (Sharp). The committee on the Dollfus prize, of 300 francs annually, has recommended that the award for 1917 be made to Dr. J. Villeneuve for his collective works on Diptera. At the meeting of February 27, 1918, the treasurer reported that the Minister of Public Instruction had granted the Society 350 francs for the support of its work. The President for 1918 is Dr. Paul Marchal. (From the Bulletins of the Society, 1917, 15—1918, 4).

Feldman Collecting Social.

Meeting of March 20th, 1918, at the home of H. W. Wenzel, 5614 Stewart St., Philadelphia. Twelve members present, Mr. Chas. Bertsch, of this city, visitor. Pres. H. W. Wenzel in the chair.

Coleoptera.– Mr. Geo. M. Greene exhibited specimens of *Mylabris amicus* Horn from near Higley, Arizona, and a dried blossom of *Agave palmeri* Englm. on which they were collected, though this is not the food plant as pointed out by Cushman, J. Eco. Ent. iv, p. 498, Dec., 1911, where he states that it had been bred in company with *M. sallaei* Sharp from pods of huisache (*Vachellia farnesiana*) from Victoria, Texas.

General.—Mr. Hornig gave an illustrated talk on the fly and mosquito problem about Philadelphia and the red tape encountered in getting any work done. This was preceded by slides of Mr. Feldman, the Jamesburg, New Jersey, and other groups of local entomologists, and some intimate views of the officers of the Social, past and present. These slides were afterwards presented to the Social.—Geo. M. Greene, *Sec'y.*

Foundation of the Entomological Society of Spain.

The Sociedad Entomológica de España was founded January 9, 1918, as the result of a proposal sent out by an organizing committee consisting of Señores Hermenegildo Gorría, of the Royal Academy of Sciences and Arts of Barcelona, *President;* José M. Dusmet, of the Royal Spanish Society of Natural History, *Vice President;* and Longinos Navás, S. J., *Secretary.* The present official location of the society is at the Colegio del Salvador at Zaragoza (Saragossa). The statutes state that the object of the society is "the theoretical and practical study of insects in their different aspects. It will include then the study of the organography, biology and classification of insects, as well as of the uses which can be derived from them or their work and of the injuries which they inflict on animals and plants.

Investigations on other lower animals, as arachnids and worms, but excluding mollusks, are also admitted. The Society adopts as its motto 'Labore et ordine.' By the word *labore* the biological and practical work is indicated and by *ordine* taxonomy. Both ideas are symbolized by a bee-hive, which will figure with the motto in the seal and medal of the society." The society will meet on the first Tuesday (not a holiday) of each month, except July, August and September, and will publish a monthly bulletin except in the three months named.

A double number (Nos. 1 and 2 of Tomo I) of this *Boletin*, for Enero, 1918, has appeared, containing the list of officers and members (2 honorary: Charles Oberthür and Antonio Berlese, and 48 ordinary or "numerarios"), the steps leading to the foundation of the society, the statutes, the first installment of a Systematic-Geographic Catalogue of the Coleoptera observed in the Iberian Peninsula, the Pyrenees properly so-called and the Balearic Islands by José M. de la Fuente y Morales, an annotated list of the Chernetida of Spain by José Fernandez Nonidez and two pages of brief notes—32 pages in all. The officers for 1918, in addition to the president, vice-president and secretary, as named above, are Señores Pedro Ayerbe, *Vice-Secretary;* José Cruz Lapazarán, *Librarian;* Miguel Padilla, *Conservator*, and José García Crespo, *Treasurer.*

OBITUARY.

The death of GUSTAVE ADOLPHE BAER at Paris, January 13, 1918, aged 79 years, was announced at the meeting of the Entomological Society of France, January 23, 1918. A native of Aarau, Switzerland, he joined the Society in 1859, spent the years 1867 to 1882 at Manila, 1896-'98 in Peru, crossed the Andes in 1900, and in 1905 made an expedition in the Province of Goyaz, Brazil. In 1886 he published a catalogue of Philippine Coleoptera in the *Annales* of the Society. (*Bull. Soc. Ent. Fr.*, 1918, No. 2.)

CHARLES EDWIN SLEIGHT, trichopterist and general entomologist, died at Ramsey, New Jersey, May 20, 1917. An obituary notice is published in the *Journal of the New York Entomological Society* for March, 1918. He was born at Yonkers, New York, May 26, 1860.

Erratum.

Page 220, line 12 for BERLING read BELING.

EXCHANGES.

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted—Friendly correspondence and exchange of Lepidoptera. Send your address and offerta. Will reply promptly.—F. E. Potter, 267 So. Main St., New Britain, Conn.

For Exchange—A few specimens, mostly Sphingidae and Saturniidae common to this region, for species from some other part of the country.—Dr. Elmer T. Learned, Fall River, Mass.

Lepidoptera—I have for exchange first class specimens of *Papilio floridensis, palamedes, Pholus fasciatus, tersa, hylaes, undulosa, Apatela tritona, Leucania pilipalpis, extincta, subpunctata, Gortyna u-album, Syneda graphica,* and hundreds of others from Pa. and Fla. Send lists, or address F. W. Friday, 82 Jacob St., Fair Haven, Pittsburgh, Pa.

Catocalae—For exchange perfect specimens of *C. pura, C. aspasia* and var. *sara, C. faustina* var. *lydia, C. praeclara.* Desire other *Catocalae.* Some of the common species wanted.—John H. West, 2057 E. York St., Phila., Pa.

Wanted to Exchange—I wish to exchange Rhopalocera from eastern United States for those of the western and southern part. Correspondence desired. Paul N. Musgrave, Pennsboro, W. Va.

Wanted in series for cash or exchange beetles of the genus *Serica* (Scarabaeidae) from all parts of North America. *Cicindela lincolniana* Casey among the exchanges offered. R. W. Dawson, Department of Entomology, University Farm, Lincoln, Nebraska.

Prof. Dr. Carlos E. Porter, Directeur des "Anales de Zoologia Aplicada," Casilla 2974, Santiago, Chile, is anxious to secure systematic papers on entomology, especially on the Thysanoptera, Coccidae, Aleyrodidae, Acarina, Chalcididae, Agromyzidae, Syrphidae and Longicornia. He will be glad to exchange specimens and publications.

Change of Address.—E. G. Titus from Logan, Utah, to Box 453, Idaho Falls, Idaho.

Wanted for Cash—Lowest insects of all families, preserved in fluid, for phylogenetic study. G. C. Crampton, Amherst, Mass.

Wanted—South American and Indian macrolepidoptera in exchange for Australian specimens in any order. (Rev.) H. S. Bodley, The Vicarage, Birchip, Victoria, Australia.

Wanted—A series of volumes of the Candian Entomologist including vols. 29, 30 and 31; also Ontario Entomological Society Reports, Nos. 2, 3, 4, 8 and 9. State condition and price wanted. M. H. Ruhmann, Vernon, British Columbia.

For Exchange—Have rare western Lepidoptera which I will exchange for butterflies. (North American preferred.) Send lists of your offerta.—Dr. John Comstock, 321 South Hill St., Los Angeles, Cal.

Wanted—Canadian Entomologist. Part xx of H. F. Wickham's Coleoptera of Canada or complete number of Can. Ent., xxix, Feb., 1897, containing same. Geo. M. Greene, 2534 W. Columbia Ave., Philadelphia, Pa.

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